

**MODERN RETAIL, INC.**

REQUEST FOR PROPOSAL

RFP #: TF – F1.H1

TITLE: HARRISBURG TEMPERATURE FORECAST

CLOSING DATE AND TIME: SEPTEMBER 15. 2017 @ 5:00 PM

Temperature Forecast: TF – F1.H1

# Background and Purpose

By responding to this Request for Proposal (RFP), the Proposer agrees that s/he has read and understood all documents within this RFP package.

# Submission Details

Responders to this RFP should supply:

* A business report up to 5 pages (not including cover page or table of contents), including any supporting plots and tables.
* The commented code (in an appendix) used to produce the results.

The report should address **all points described in the “Objective” section** below.

The report should be returned in the following way:

* Electronic (mailto: [sjsimmo2@ncsu.edu](mailto:sjsimmo2@ncsu.edu); Subject Line: Harrisburg Temperature Forecast)

# Objective

Modern Retail Incorporated (hereafter the “Store”), acting by and through its department of *Marketing and Sales Analysis* is seeking proposals for retail analytics services. The scope of services includes the following:

* Creation of an hourly forecast for temperature in Harrisburg, PA for August 27, 2017 from an Exponential Smoothing Model (ESM), to be used for evaluating consumer behavior; The Store’s analysts believe that extreme outdoor temperatures may affect the sales of the main retail location in Harrisburg, PA; They want a forecast of these temperatures to help them further evaluate this claim.
* Creation of easy to read and interpret visualizations of the following:
  + Actual temperatures overlaid with the trend/cycle for the training set.
  + Actual temperatures overlaid with the seasonally adjusted temperatures for the training set.
  + For the trend/cycle and seasonal breakdown, the current team uses classical decomposition; The Store is open to other techniques as long as the reasons are clearly stated and supported.
  + Forecasted temperature values overlaid with the actual temperature values on August 27, 2017 (validation set).
* The Store’s analysts are open to either additive or multiplicative ESM’s; However, the reasons for choosing either must be clearly stated and supported.
* The Store uses Mean Absolute Percentage Error (MAPE) in calculating the accuracy of its forecasts; Report this measure for the 24 hourly forecasted temperatures on August 27, 2017; The Store is open to other measurements in addition to the MAPE as long as they are clearly stated and supported.
* The Store’s analysts recommend testing the residuals from the final ESM to check if they are white noise; The p-value and test statistic should be listed as well as results interpreted.

# Data Provided

The following two sets of data are provided for the proposal:

* The data set **HARRISBURG\_TRAIN** contains hourly observations from August 1, 2017 to August 26, 2017. The variable **TEMP** is the temperature of interest.
  + The variable YR—MODAHRMN contains the data and time of the observation. The first four values is the year (2017) and the next four values are the month and day (for example 0801 is August 1st) and the next four values is the time. So for example, 201708010056 is the observation taken on August 1st, 2017 at 12:56 am.
  + The data is collected directly from the National Climatic Data Center and is not previously cleaned. Check to make sure you have 24 hourly readings a day. If not, you will have to adjust your data set accordingly.
* The data set **HARRISBURG\_VALID** contains the same data for August 27, 2017.